

**JOINT LEGISLATIVE SUNSET
REVIEW COMMITTEE FINDINGS AND
RECOMMENDATIONS**

**Review and Evaluation of the
Board of Registration for Geologists and Geophysicists**

**Report to the
Department of Consumer Affairs**

FEBRUARY 1996

JOINT LEGISLATIVE SUNSET REVIEW COMMITTEE

Senator Ruben S. Ayala
Chairman

Senate Members

Senator Daniel Boatwright
Senator Maurice Johannessen

Assembly Members

Assemblyman Jim Morrissey
Assemblywoman Jackie Speier
Assemblyman Bruce Thompson

Staff

Bill Gage
Consultant

Staff Assistance Provided By:

Jay DeFuria
Consultant
Senate Business and Professions Committee

G.V. Ayers
Consultant
Senate Business and Professions Committee

Michael Abbott
Consultant
Senate Business and Professions Committee

Kim Connor
Consultant
Senate Office of Research

TABLE OF CONTENTS

Summary of Recommendations and Findings	i
Overall Approach to the Sunset Review	1
Summary of Current Regulation	6
1. Evaluation of Board's Operations and Programs	
A. General Responsibilities, Duties and Powers of the Board	10
B. Funding and Organization of the Board and Staff	13
C. Licensing and Application Process	14
D. Continuing Education and Review of Professional Competence	15
E. Examination Process	16
F. Complaint Process	18
G. Enforcement Process	19
Unlicensed Activity	
Inspections	
Investigations	
Disciplinary Action	
H. Efforts to Improve the Current Regulatory Process	
Operational Improvements	
Legislative Efforts.	22
2. Review of Need for State Licensing and Regulation of Geologists and Geophysicists	25

SUMMARY OF RECOMMENDATIONS AND FINDINGS

ISSUE #1: Should the Board of Geologists and Geophysicists be continued as a separate agency, merged with another board, or sunsetted and have all of its duties, powers and functions turned over to the Department of Consumer Affairs?

RECOMMENDATION:

The board should be continued as a separate agency, but the board should be reconstituted, its size reduced from 8 to 7, and it should be composed of four public members, two geologists and one geophysicist. The sunset date should be extended for four years until the next sunset review.

FINDINGS:

A. General Responsibilities, Powers and Duties of the Board

- 1. The duties and powers of the board are defined by statute and regulation and it does not appear that they have exceeded their legal authority at any time. However, the board has been lax in using its authority to investigate potential violations of its licensing act.*
- 2. The board has a general policy relating to conflicts of interest for its board members, executive officer and employees. But it does not have written standards of conduct for board members.*
- 3. The board has not adopted any regulations concerning standards of practice or care to be used by geologists, geophysicists, certified engineering geologists, or hydrogeologists. However, the board has adopted “unenforceable” guidelines and standards for performing competent investigations and reports (“practice guidelines”). The board has not adopted any code of ethics for the profession.*
- 4. It has been argued that the board defines the practice of geology too broadly, and includes several areas of practice which have traditionally been considered as the separate fields of soil science and hydrology (principally, the fields of contaminated soil and groundwater).*

5. The board has not been involved, to any significant degree, in strategic planning, basic self-assessment, quality management practices, or reorganization efforts to improve the board's overall effectiveness and efficiency.

B. Funding and Organization of the Board and Staff

1. The board has spent, on average, only 30 percent of its budget on enforcement activity over the past four years. Other boards have spent, on average, about 66 percent.

2. The organizational breakdown and workload of the board and staff seem to provide the most efficient expenditure of funds. However, an additional staff person may be requested, but their time would be split between examination and enforcement responsibilities.

C. Licensing and Application Process

1. The experience requirement is somewhat excessive and arbitrary when compared with other states, and does not seem necessary to assure that geologists and geophysicists are competent.

2. There is basically no comity or reciprocity for out-of-state geologists or geophysicists.

3. There appears to be undue delays in the licensing and application process.

D. Continuing Education and Review of Professional Competence

1. The board does not have a continuing education requirement.

2. Remedial education is not required under the board's disciplinary powers.

E. Examination Process

1. The exam given by the board has a very low passage rate.

2. The examination requirement appears to be an artificial barrier to entering into this profession, since it seems to be testing more than what is necessary to test the competence expected of an entry-level geologists. It also costs the understaffed board more than 50% of its annual budget.

3. *Reasons given for rejecting the use of the national exam seem arbitrary.*
4. *For the first 15 years of the board's existence, the vast majority of those licensed were "grandfathered in" and not required to take the examination. Over 28% of current licensees were registered under the grandfathering provisions.*

F. Complaint Process

1. *There are very few complaints filed against the 4,250 licensed geologists or geophysicists.*

G. Enforcement Process

Unlicensed Activity

1. *The board has taken little, if any, action against unlicensed activity in the past four years.*
2. *The practice of the geology and geophysicist profession is not clearly defined so as to determine licensed versus unlicensed activity.*

Investigations

1. *The board has had few investigations over the past four years.*
2. *The board has not been involved in any inspections or audits of geologic reports.*
3. *There have been substantial delays in completing investigations.*

Disciplinary Action

1. *Cite and Fine regulations under Section 125.9 of the Business and Professions Code were written concurrently with those for Sections 145 through 149, and were only recently adopted by OAL.*
2. *The board has taken little, if any, action against licensees over the past four years for incompetence or other violations of the licensing act.*

Disciplinary Case Aging Data

1. *There have been delays in completing enforcement cases.*

Enforcement Costs

1. *Costs of investigation and prosecution are a small part of the overall budget of the board.*

2. The board has made little use of its cost recovery authority under Section 125.3 of the Business and Professions Code.

H. Efforts to Improve the Current Regulatory Process

Operational Improvements

1. The board's regulatory mission is somewhat impeded by budgetary, resource and staffing constraints.

2. The board's administrative and regulatory changes have not improved its operations or increased its ability to operate more in the public interest.

3. The board's proposed administrative and regulatory changes do not address some of the basic problems which are identified in this report.

Legislative Efforts

1. Legislative efforts by the board have not substantially improved the current regulatory program.

2. The board's proposed statutory changes only minimally address some of the basic problems which are identified in this report.

ISSUE #2: Should the State continue with the licensing and regulation of geologists and geophysicists and, if not, should some other alternative form of regulation be recommended?

RECOMMENDATION:

The State should continue with the licensing and regulation of the practice of geology and geophysics.

FINDINGS:

- 1. There is some evidence that the unregulated practice of geology and geophysics could endanger the health, safety or welfare of the public and cause significant public harm, but in most instances, only indirectly.*
- 2. Geologists and geophysicists make judgments which could have potentially major financial, health, safety or other significant consequences for the consumer, but whether harm actually occurs is difficult to determine.*
- 3. Judgments made by geologists and geophysicists require a high degree of skill and knowledge.*
- 4. These judgments are, for the most part, independent of oversight or supervision by another person or group.*
- 5. There is a generally accepted core amount of knowledge, skill and ability that a geologist and geophysicist must have to meet minimum competency requirements, but indicators of incompetent practice may be more difficult to measure.*
- 6. There does not appear to be any significant public demand for the regulation and licensing of geologists and geophysicists, and there are those within the profession who have opposed licensure.*
- 7. California is unique in the large number of laws and regulations requiring the investigation of geologic hazards by geologists.*
- 8. Components of the current regulatory program do not appear to provide protections to the consumer and preclude consumer harm.*
- 9. There are other ways in which the consumer can control their exposure to the risk of harm which could be caused by poor geologic investigations and reports.*
- 10. Most consumers of geologic services are more sophisticated than the average public about purchasing those services, and therefore can readily evaluate the performance of a geologist or geophysicist.*
- 11. There are other public agencies, both state and local, which provide some oversight of the services provided by geologists and geophysicists, but there are few geologists and geophysicists who are currently licensed or regulated by another board.*

12. *There are 26 states which regulate geologists. No other states regulate geophysicists. No other states have deregulated the profession of geology once a license act has been enacted. For those states which do not regulate geologists and geophysicists, there is no indication that consumer harm has resulted.*

13. *There does not appear to be any substantial savings to the consumer (agencies or businesses) which would result if the licensing of geologists and geophysicists was eliminated.*

14. *There are some occupations similar to geologic and geophysical practices which are not regulated.*

15. *Geologists and geophysicists do, however, work with many other professions, some of which are licensed.*

16. *There may be other alternatives to the current regulatory program which would not require the licensing of geologists and geophysicists.*

<p>ISSUE #3: What changes should be made to the current regulatory program to improve its overall effectiveness and efficiency so that it may operate more in the public interest?</p>

RECOMMENDATIONS:

1. *The board should implement all recommendations contained in its report submitted to the JLSRC insofar as they are consistent with the following recommendations.*

2. *The board should review public files, when possible, at cities, counties, and state agencies where geologic reports are filed to determine whether violations have occurred. If a BCP is requested for extra staff, this person should be devoted entirely to this effort and any other enforcement activity only.*

3. *The board should adopt standards of practice or care to be used by geologists, geophysicists, certified engineering geologists, and hydrogeologists. It should also adopt a code of ethics for the profession.*

4. *Standards for “negligence” and “incompetent practice” should be adopted.*

5. *The board should initiate strategic planning, quality management practices, and performance based budgeting methods.*

6. *The seven years of experience requirement should be abolished and a more appropriate experience requirement adopted if it is determined necessary.*

7. *The board should have the Department’s Office of Examination Resources evaluate the necessity for using the current geologist examination, and determine whether the*

national examination could be used instead, or whether changes could be made to the current exam to increase the passage rate.

8. *The board should require that all agencies which have oversight over geological reports and information immediately submit complaints concerning substandard reports or information provided, or immediately submit the actual substandard report if it contains false or misleading information, so the board can take immediate action.*

9. *The board should spend more than 30 percent of its budget on enforcement activity and less on its examination program, and become more proactive in its enforcement program.*

10. *The board should make better use of its cost recovery authority.*

11. *The practice of geology and geophysicist profession should be more clearly defined so as to determine licensed versus unlicensed activity, and the board should begin using its “cite and fine” authority immediately.*

12. *The board should also meet with representatives of the professional societies in Soil Science and Hydrology so as to differentiate the practice of geology from the defined fields of soil science and hydrology.*

OVERALL APPROACH TO THE SUNSET REVIEW

CURRENT APPROACH TO REVIEW

Legislation enacted in 1994 (Chapter 908/94, SB 2036, McCorquodale), put in place a procedure and schedule for the Legislature to assess the effectiveness of, or need for, state involvement in the 32 occupational areas currently regulated by various boards. ("Board," as used in this document, refers to a "commission," "committee," "examining committee," or "organization" that has the ultimate responsibility for administration of a regulatory program as required under provisions of the Business and Professions Code.)

Pursuant to this new law, independent boards become inoperative, according to a specified schedule, on July 1 of either 1997, 1998, or 1999. The respective statutes are then repealed six months later, on January 1 of either 1998, 1999, or 2000. Thus, the boards and their regulatory authorities "sunset," unless the Legislature passes laws to either reinstate the board or extend its sunset date.

Chapter 908 (1994) creates the Joint Legislative Sunset Review Committee (JLSRC) to review and analyze the effectiveness of and need for each of the boards. Each board, with the assistance of the Department of Consumer Affairs (DCA), is required to submit to the JLSRC -- 15 months before January 1, of the year its authorizing legislation becomes operative -- an analysis of its regulatory functions and reasons to continue regulatory activities. (Reports from the boards scheduled to sunset in 1997 were, therefore, due by October 1, 1995.)

The JLSRC must hold public hearings during the interim study recess to solicit testimony from the director of Consumer Affairs, the boards scheduled to sunset, the public, and the regulated industries/occupations. During those hearings, the committee members must evaluate and determine whether a board or regulatory program has demonstrated a public need for the continued existence of the board or regulatory program and for the degree of regulation based on the factors and minimum standards of performance listed below:

- (1) Whether regulation by the board is necessary to protect the public health, safety, and welfare.
- (2) Whether the basis or facts that necessitated the initial licensing or regulation of a practice or profession have changed.
- (3) Whether other conditions have arisen that would warrant increased, decreased, or the same degree of regulation.
- (4) If regulation of the profession or practice is necessary, whether existing statutes and regulations establish the least restrictive form of regulation consistent with the public interest, considering other available regulatory mechanisms, and whether the board rules enhance the public interest and are within the scope of legislative intent.

(5) Whether the board operates and enforces its regulatory responsibilities in the public interest and whether its regulatory mission is impeded or enhanced by existing statutes, regulations, policies, practices, or any other circumstances, including budgetary, resource, and personal matters.

(6) Whether an analysis of board operations indicates that the board performs its statutory duties efficiently and effectively.

(7) Whether the composition of the board adequately represents the public interest and whether the board encourages public participation in its decisions rather than participation only by the industry and individuals it regulates.

(8) Whether the board and its laws or regulations stimulate or restrict competition, and the extent of the economic impact the board's regulatory practices have on the state's business and technological growth.

(9) Whether complaint, investigation, powers to intervene, and disciplinary procedures adequately protect the public and whether final dispositions of complaints, investigations, restraining orders, and disciplinary actions are in the public interest; or if it is, instead, self-serving to the profession, industry or individuals being regulated by the board.

(10) Whether the scope of practice of the regulated profession or occupation contributes to the highest utilization of personnel and whether entry requirements encourage affirmative action.

(11) Whether administrative and statutory changes are necessary to improve board operations to enhance the public interest.

The JLSRC must also consider alternatives to placing responsibilities and jurisdiction of the board under the Department of Consumer Affairs.

The JLSRC must then report its findings and recommendations to the DCA for its review. The DCA must then prepare a final report including its own findings and recommendations and those of JLSRC. This final report must then be submitted to the Legislature within 60 days, and shall include whether each board scheduled for repeal should be terminated, continued, or re-established, and whether its functions should be revised. If the JLSRC or DCA deems it advisable, the report may include proposed bills to carry out these recommendations.

REQUEST FOR INFORMATION AND BOARD REPORT

As indicated, all boards are required to prepare an analysis and submit a report to the JLSRC "no later than one year plus 90 days prior to the January 1st of the year during which that board shall become inoperative." (October 1, 1995, was the deadline for those boards which sunset in 1997.)

The analysis and report must include, at a minimum, all of the following:

- (a) A comprehensive statement of the board's mission, goals, objectives and legal jurisdiction in protecting the health, safety, and welfare of the public.
- (b) The board's enforcement priorities, complaint and enforcement data, budget expenditures with average and median costs per case, and case aging data specific to post and pre-accusation cases at the Attorney General's office.
- (c) The board's fund conditions, sources of revenue, and expenditure categories of the last four fiscal years by program component.
- (d) The board's description of its licensing process including the time and costs required to implement and administer its licensing examination, ownership of the license examination, and passage rate and areas of examination.
- (e) The board's initiation of legislative efforts, budget change proposals, and other initiatives it has taken to improve its legislative mandate.

In an attempt to reconcile this requirement for information, along with those considerations and factors which the JLSRC must make during its deliberations, a request for information was prepared by JLSRC staff and sent to all boards on July 3, 1995.

The request asked a number of questions about the board's operations and programs, about the continued need to regulate the particular occupation, and about the efforts which the board has made, or should make, to improve its overall efficiency and effectiveness. There was also a specific request for information dealing with the board's funding, licensing, examination, complaint and enforcement process for the past four years.

Staff then continued to meet with boards, as needed, to assist them in compiling this information and completing the report.

The report submitted by each board was broken down into three parts. The first part, provided background information dealing with each aspect of the board's current regulatory program. This included the board's powers, duties and responsibilities, its funding and organization, the licensing, examination, continuing education, and enforcement activities of the board for the past four years.

The second part of the report, addressed the issue of whether there is still a need to regulate this particular occupation. The questions addressed by the board were basically those which are asked during any "sunrise review" process, i.e., the current process used by the Legislature to evaluate the need for regulation.

The third part of the report, discusses any regulatory or legislative efforts the board has made, or are needed, to improve its current operation and protection of the consumer.

There are some appendices which were included as part of their report. There are also appendices (attachments) which, because of their length, or because they were not essential to the overall information contained in the original report, were not provided with the report. They were, however, available to members of the JLSRC upon request.

JLSRC REPORT OF FUNDINGS AND RECOMMENDATIONS

The JLSRC must provide to DCA a report of its findings and recommendations after hearings are completed. This document has been prepared in an attempt to meet that mandate.

The findings and recommendations in this report are based on information and testimony received during the hearings conducted by the JLSRC on November 27th, 28th and December 5th, 1995. It also reflects information which was provided in the board's report, information provided by the Department of Consumer Affairs, a review of the current literature dealing with occupational licensing issues, and a comparative analysis of occupational licensing in other states performed by the Senate Office of Research.

The document begins with a short summary of the current regulatory program and discusses the creation of the licensing act, the board's budget, revenue and fees collected, an overview of licensing activity and the required examination, and disciplinary/enforcement actions.

Part one, provides an overall evaluation of the board's operations and programs. This section includes everything from the general responsibilities and duties of the board, to the licensing, examination and enforcement process. There are findings made about each function and activity of the board.

Part two of this document, is a review of the need to regulate this particular occupation. The issues are those which are addressed during the current "sunrise review" process, and those which must be considered by the JLSRC under the current law.

SUMMARY OF CURRENT REGULATION

Background

- Through the 1950's and early 60's, cities and counties became concerned about having qualified geologists available to investigate potential hazards from landslides. They created 20 or more local geologist qualification boards. This system resulted in individuals needing eight or ten "approvals" in order to do work in their general area. This became an excessively burdensome system upon consulting geologists, and expensive for each city and county, not to mention the lack of uniformity in application between these different panels. By 1967, the City and County of Los Angeles had become tired of being in the geologist registration business and decided to work towards statewide geologist regulation in 1967. With the support of some geologist groups (but not all) legislation was enacted in 1969, which created the Board of Registration for Geologists and Geophysicists (board) to regulate the practice of geology. In 1972, the board's jurisdiction was extended to include geophysicists.
- The board comprises eight members, five of whom are public members, two of whom are geologists, and one of whom is a geophysicist. The two registered geologists are a petroleum geologist and a Certified Engineering Geologist. The Governor appoints three of the public members and the three professional members of the board. The Senate Rules Committee and the Speaker of the Assembly each appoint one public member of the board.
- The Geologist and Geophysicist Act (Act) regulates the practice of geology and geophysics, and the titles granted to those licensed by the board are "Registered Geologist" and "Registered Geophysicist." Two specialty licenses exist for those who are already Registered Geologists. These specialty titles are "Certified Engineering Geologist" and "Certified Hydrogeologist." The specialty licenses are title regulation within the practice regulation of Registered Geologist.
- The board licenses (registers) approximately 3900 registered geologists, and 340 registered geophysicists. It certifies about 1432 certified engineering geologists, and will be certifying hydrogeologists beginning this year. (About 577 applied for hydrogeologist exam in 1995, 224 passed in March 1995, and 7 licenses (certifications) were issued as of July 1, 1995.)
- There are 26 states which regulate geologists. No other states regulate geophysicists. Eighteen (18) of the states have practice protection laws similar to California, 5 have title protection laws only, and 4 have a statutory definition of the practice.

Budget

- The board's budget for the current fiscal year (FY 1995/96) is \$785,482. In FY 1994/95, the board's budget appropriation was \$584,270, of which \$181,501 was the total expenditure for all enforcement costs (31% of the total expenditures). The board has spent, on average, about 30% of its budget for enforcement activity over the past four years. The board derives its revenues entirely from licensees, and is a special fund agency. Anticipated revenues for FY 1995/96, are \$688,600, of which most is received from renewal fees. Revenues received for FY 1994/95, were \$605,497.
- The board was authorized for 8.3 staff positions in FY 1994/95. The current staff positions are the executive officer, an associate government program analyst, a staff services analyst, office assistant and temporary help.
- The board generally meets about 4 times per year. Board members receive a per them of \$100 for each day spent in actual discharge of official duties, and also receive travel expenses and are reimbursed for other expenses necessarily incurred in the performance of official duties. For FY 1994/95, \$10,500 was spent for board member per them and \$44,600 for total travel by staff and board members..

Fees

- The board's license (registration or specialty certification) is good for two years. The board's fee structure is currently: Application for registration or specialty certification - \$100; Renewal fee for registration - \$200; Renewal fee for specialty certification - \$50; Temporary registration fee - \$80. The delinquency fee for renewal of registration or specialty certification is 50% of the renewal fee in effect on the date of its expiration.

Education and Experience Requirements

- The requirements for licensure as a geologist are either, 1) graduation from an acceptable school or university with a degree in geology, or 2) completion of 30 semester units in geologic science course leading to a major in geology, of which at least 24 units are in the third or fourth year, or graduate courses. The requirements for a geophysicist are similar except that the degree or course work is either with a major in geophysical science or any other discipline, which in the opinion of the board is relevant to geophysics.
- The experience requirement is seven years, with two years experience credit for a bachelor's degree, and two more years for graduate work. The experience must be gained under the immediate supervision of a registered geologist, civil engineer or petroleum engineer. For admission to the examination for a "Certified Engineering Geologist," the individual must already be a registered geologist and the experience

must have been under the direct supervision a certified engineering geologist or registered civil engineer. For "Certified Hydrogeologist" the requirements are similar, but experience must be gained under the supervision of a registered geologist or certified engineering geologist who has at least 5 years of experience in hydrogeologic work.

Examinations

- Four exams are given by the board twice a year: one for Registered Geologist, one for Registered Geophysicist, one for Certified Engineering Geologist, and one for Certified Hydrogeologist. (The board in 1995 returned to providing exams twice a year. They indicated that this represented the accomplishment of a long term goal by the board and its examination committee to return to twice annual testing.)
- The examinations for geologist and geophysicist last 4 1/2 hours for openended problems, and 2 1/2 hours for multiple choice questions. The examinations for certificated specialties are shorter because the applicants have already passed the registered geologist exam. The four examinations are written and prepared by the Board's Examination Committee. Examination validation (or referred to as "Task Analysis" by the board) was performed for registered geologist, registered geophysicist, and certified engineering geologist during FY 1991/92 and FY 1992/93.
- The largest amount of examinees sit for the registered geologist exam. Approximately 7200 since 1970. About 2700, have passed the exam. The passage rates for examinees sitting for the registered geologist exam have declined over the past four years, but the number taken the exam has also risen. The average passage rate for the past four years is about 30%. However, the passage rate for first time takers in March 1995, was only 19%. (This was the first time data was available for first time takers. A substantial number of candidates for the exam are taking it five and six times.)

Discipline/Enforcement

- The board reports that nearly all the complaints it receives regarding licensees is either for unlicensed activity, incompetence or negligence. The board received a total of 108 complaints in the past four fiscal years, but most complaints have fallen off since 1992/93. In FY 1992/93, 41 complaints were received, while in FY 1994/95 only 15 complaints were received.
- Only 9 cases were investigated in FY 1991/92, 2 cases in 1992/93, 1 case in 1993/94, and no cases in 1994/95. The board has not been involved in any inspections or audits of geologic reports due to lack of staff, and has had to rely on complaints being filed with the board. (The board will be submitting a BCP for a licensed staff person to perform inspections/ audits of geologic reports filed with city and county agencies.)

- The board just recently received approval of its "cite and fine" regulations by the Office of Administrative Law.
- A total of 4 accusations have been filed over the past four years. Of those, a stipulated judgment was reached for one, a license surrendered for another, and three are pending with the Attorney General's Office.
- Costs for investigation(DOI), the Attorney General, for evidence/witness fees, and the Office of Administrative Hearings (OAH), were about 7 percent of the total budget of the board. It is interesting to note, that out of a total of \$44,000 spent on enforcement costs in FY 1994/95, \$27,000 was for expert witnesses.

1.

**EVALUATION OF BOARD'S OPERATIONS
AND PROGRAMS**

ISSUE: Should the Board of Geologists and Geophysicists be continued as a separate agency, merged with another board, or sunsetted and have all of its duties, powers and functions turned over to the Department of Consumer Affairs?

RECOMMENDATION:

The board should be continued as a separate agency, but the board should be reconstituted, its size reduced from 8 to 7, and it should be composed of four public members, two geologists and one geophysicist. The sunset date should be extended for four years until the next sunset review.

FINDINGS:

A. General Responsibilities, Powers and Duties of the Board

1. The duties and powers of the board are defined by statute and regulation and it does not appear that they have exceeded their legal authority at any time. However, the board has been lax in using its authority to investigate potential violations of its licensing act.

- Although the Business and Professions Code Section 7870 has existed since 1968, and clearly gives the board authority to investigate potential violations on its own behalf, it only recently asked for a legal opinion as to whether it could investigate potential violations without a complaint being filed. The board indicates it will now be able to review public files at cities, counties, and state agencies where geologic reports are filed to determine whether violations have occurred. However, no time line is given for this activity to begin, and the board is still unsure whether these reports could then be used as evidence that a violation has occurred.

2. The board has a general policy relating to conflicts of interest for its board members, executive officer and employees. But it does not have written standards of conduct for board members.

- The board adheres to those conflict of interest provisions generally outlined in the Government Code pertaining to "public official." But it does not appear that the board has any written standards of conduct pertaining to board members.

3. The board has not adopted any regulations concerning standards of practice or care to be used by geologists, geophysicists, certified engineering geologists, or hydrogeologists. However, the board has adopted "unenforceable" guidelines and standards for performing competent investigations and reports ("practice guidelines"). The board has not adopted any code of ethics for the profession.

- The board has adopted four guidelines for various types of reports. These guidelines indicate the information and format which is typically needed in a report on: 1) groundwater investigations; 2) earthquake and/or fault hazard; 3) engineering geologic investigations; and, 4) geophysical investigations. Specific site conditions, or the requirements and purpose of an investigation may result in either more information or less information being necessary for a competent investigation and report. Guidelines and standards are also established by various city, county, and state agencies which are receiving geologic reports, as well as the California Division of Mines and Geology. These guidelines are basically unenforceable, the violation of which is not grounds for discipline by this board.
- The board does have express disciplinary jurisdiction over "negligence [and] incompetency", but it has not adopted one regulation which sets standards for performance of any of those functions, or which defines "negligence" or "incompetency" for purposes of keeping the license to practice geology in California. The board does not give any reason for not adopting regulations pertaining to incompetent practice. As for "negligence", the board indicates that it has been careful to avoid making its guidelines into negligence standards. It argues, that since the early 1980's, the board's legal counsels have insisted that the board cannot adopt a regulation concerning standard of care. Each situation must be evaluated independently. "This allows for rapidly changing methods and adaptability to different site and project conditions." Consequently, the board has no specific negligence standards established in regulation to evaluate negligence. However, the board has disciplined licensees on the basis of negligence.
- The Center for Public Interest Law argues the board is wrong, and it is authorized to at least adopt some professional standards to define "negligence" or "incompetence," but that it professes impotence because it does not want to regulate post-entry [practice].
- The board claims that it is not authorized by the Act to adopt a code of ethics. It does not appear that the board would need express statutory authority to perform this function.

4. It has been argued that the board defines the practice of geology too broadly, and includes several areas of practice which have traditionally been considered as the

separate fields of soil science and hydrology (principally, the fields of contaminated soil and groundwater).

- The Professional Soil Scientist Association of California (PSSAC) argues that the current rules and interpretations of the board define the practice of geology extremely broadly and virtually any issues involving rocks, soils and water can be construed as geology according to this definition. As such, areas of practice which have been considered as traditionally part of soil science constitute the practice of geology. Soil scientists could be cited or fined for unlicensed activity, even though the Geologist and Geophysicist Act specifically excludes "activities relating to soil science."
- PSSAC claims that it has discussed this issue with the board over the last several years, but the board has not been proactive in resolving this issue. They have instead further broadened the definition of the practice of geology by adding the title of hydrogeologists, and this has further confused the issue. Accordingly, they believe that changes to the Practice Act, or administrative changes to the board's rules and regulations are necessary to correct this ongoing problem. They ask that the Board or the Department of Consumer Affairs be directed to discuss necessary changes with representatives of the appropriate professional groups.

5. The board has not been involved, to any significant degree, in strategic planning, basic self-assessment, quality management practices, or reorganization efforts to improve the board's overall effectiveness and efficiency.

- The board claims it is continuously involved in evaluating the efficiency and effectiveness of its operations. However, it has not been involved in a formal strategic planning process similar to other boards. They indicate, in light of preparing the report for the sunset review process, that they have gained an awareness of various processes, statistics, and operations of the Board and staff. The board recognizes there is a need to promulgate additional written policies and procedures, such as a full description of the Legislative Committee's role, board attendance policies, and other items in the process of being developed.
- The board points out that its achievements over the past few years are significant, and include carrying two regulation packages simultaneously: 1) hydrogeologist licensing; and 2) cite and fine authority. It has also completed an enforcement case which was highly publicized in the media and throughout the industry, and achieved a major goal of returning to semi-annual examinations without a staff increase.
- The board recognizes the need for quality management and systematically reviews its policies and procedures, upgrading the quality of its functions. In 1993 a Task Force was proposed to instigate quality management procedures throughout State government. The intent of the Governor's proposed 1993, Executive Order gave the board further impetus to review its practices. As a result, all internal memoranda and

policies regarding board functions have been revised, upgraded and modernized, and all important forms and public information documents have been modified.

B. Funding and Organization of the Board and Staff

1. The board has spent, on average, only 30 percent of its budget on enforcement activity over the past four years. Other boards have spent on average about 66 percent.

2. The organizational breakdown and workload of the board and staff seem to provide the most efficient expenditure of funds. However, an additional staffperson may be requested, but their time would be split between examination and enforcement responsibilities.

- The board is proposing to submit a budget change proposal for a new hire. This new professional staff person will assist with examinations about 40% and proactive enforcement and public awareness 60% of their time.
- The board recently indicated that they have now decided to use this person on a full-time basis for enforcement purposes.

C. Licensing and Application Process

1. The experience requirement is somewhat excessive and arbitrary when compared with other states, and does not seem necessary to assure that geologists and geophysicists are competent.

- The experience requirement for licensing a geologist is seven years, with two years experience for a bachelor's degree, and an additional two years experience credit for graduate work toward a Masters or Ph.D. The experience must be gained under the immediate supervision of a registered geologist or a registered civil engineer or a registered petroleum engineer. For a Certified Engineering Geologist, they must already be registered and have had experience under the supervision of a Certified Engineering Geologist or Registered Civil Engineer. For a Certified Hydrogeologist, they must also be a registered geologist with five years of experience under the supervision of a registered geologist or certified engineering geologist who has five years of experience in hydrogeologic work. (The requirement will change to three years after a larger pool of Certified Hydrogeologists exist.)
- The board claims that the experience requirement is intended to provide the opportunity for the applicant to learn the practical and field aspects of geologic work under the tutelage of a well-experienced individual who is able to clarify geologic issues in the public interest for the new geologist.
- It is unknown how many other states require seven years of experience to become a registered geologist. However, the Association of Engineering Geologists' *"Handbook of Geological Registration Laws" (1991)*, indicates that there are only 10 other states which require seven years for "engineering" geologists, and four states which require five years.
- Work that is strictly technical in nature (that is, routine and repetitive work not requiring substantial judgment) is not considered appropriate geologic experience and time spent in positions of that type will not be credited toward the work experience requirement. The individual supervisors must complete and send in reference form documenting the applicants experience in terms of 1) the nature of the task performed, and 2) time spent at each pertinent task. The supervisors estimate the percentage of time the applicant spends in responsible charge.
- This whole process, of deciding when the work experience requirement has been met, appears to be somewhat arbitrary in its application. Considering the amount of experience required, along with passage of the exam, could take a graduate anywhere from five to ten years to gain entry into the profession. This far exceeds any other experience requirement of other boards, and seems completely unnecessary to assure a minimum level of competence for a geologist or geophysicist.

2. There is basically no comity or reciprocity for out-of-state geologists or geophysicists.

- A person licensed in another state or country is not allowed to practice geology or geophysics in California until they have completed the application process and either passed an equivalent examination or they have taken and passed the California examination. They would also have to meet the same experience requirements. At present time, the board only recognizes the Idaho examination as equivalent.
- There is an allowance in the law for temporary authorization for out-of-state geologists and geophysicists to work on single projects of short duration. They must appear before the board to demonstrate knowledge in the phase of geology or geophysics which they intend to perform under the temporary authorization.

3. There appears to be undue delays in the licensing and application process.

- Although a breakdown of actual numbers is not available, it appears that the time from submission of an application to when a license is issued, could take as long as one to two years.

D. Continuing Education and Review of Professional Competence

1. The board does not have a continuing education requirement

- Historically, three reasons have inclined the board to not attempt a legislative change to implement continuing professional development. First, most geologists and geophysicists do a variety of activities for their professional development on a continuous and voluntary basis. Second, convincing evidence that continuing education actually makes a difference has not been presented. Third, a mandatory program could be extremely expensive for the individual licensee.
- Recently, however, the Seismic Safety Commission requested the board to adopt a continuing education program. Their request is directly related to failures during the Northridge Earthquake.
- Only three states require some form of continuing education for licensed geologists. As yet, there has been no proof that continuing education for geologists and geophysicists would be beneficial, or that it has some demonstrated correlation with improved practice.
- The board indicates that it is initiating an evaluation of continuing professional development, and claims that legislation, which would allow the board to develop an appropriate program by regulation, appears to be the most reasonable approach at this time.

2. Remedial education is not required under the board's disciplinary powers.

- The board states, that if granted the power to require specific remedial education under the board's disciplinary powers, it could require appropriate course work instead of, or in conjunction with, a fine. This approach would meet the board's mission to "continuously enhance the quality ... of geological and geophysical services."

E. Examination Process

1. The exam given by the board has a very low passage rate.

- The passage rate for geologists has steadily declined since 1970, from a high of 75% to a low of 24% in 1993. For 1995, only 19% of first-time takers passed the geology exam. A number of examinees were still taking the exam a fourth and fifth time. Of course, over the years more and more geologists have been taking the exam.
- The board does point out, that the more years of work experience the geologist has, the better the passage rate. For example, those with 7-8 years of experience had a passage rate of 46%.
- The board points to an overall increase in passage rate from 26% in 1994, to 37% in 1995. (This does not reflect first time takers as indicated earlier.)

2. The examination requirement appears to be an artificial barrier to entry into this profession since it does not seem to be testing California-specific material, is unnecessary to test the competence expected of an entry-level geologist, and costs the understaffed board more than 50% of its annual budget.

- In its report, the board devotes a great deal of attention to its current examination. The board does not use a nationally standardized examination, but recently developed its own exam which was validated by a private outside firm (Donnoe and Associates) and was first administered in 1993. This exam contains two parts: a multiple-choice section, and an essay section which contains open-ended questions of a practical problem-oriented type. Each actual exam is written and prepared by the board's Examination Committee from a databank of exam questions, and are graded by other registered geologists, etc., who are subject matter experts.
- The board claims, that because of its declining pass rate, it recently contracted with a consulting firm, Donnoe & Associates, to collect information on which tasks were critical for the occupation, and what knowledge and ability should be tested on the licensing examination. The board argues that the Donnoe Study effectively addressed the issue of the appropriateness of the examination's scope and content, and found that the knowledge and abilities needed were being tested, and in essentially the correct proportions, and that it is unlikely that the content of the questions is the

cause of the declining pass rate. However, there is no indication that any psychometric evaluation of the current test was done to determine if the essay portion is absolutely required to evaluate competence -- or that it is even cost beneficial.

- When the current exam was being prepared and validated, the board discussed its development at its November 1992 meeting. At that time, several board members noted that only 4% of the multiple-choice section is devoted to California-specific geology issues. The board did not discuss the proportion of the essay exam which is California-specific.
- From fiscal year 1991-92 to the present, the board has spent over half of its annual budget on its examination and licensing process. A great deal of this cost is consumed in the grading of the essay portion of the exam.

3. Reasons given for rejecting the use of the national exam seem arbitrary.

- There is a national exam prepared by the national Association of State Boards of Geology (ASBOG), which is multiple choice only. Eleven of the 18 states which license geologists use this exam. The board's reasons for rejecting the ASBOG's test are not stated in its sunset report; however, at its August 1993 meeting, the board agreed that "the depth of material is insufficient; lack of an essay section is unacceptable; and the problem solving section is not comparable to the board's exam." This conclusion seems without justification in light of several statements in the board's report. The board first pointed out that similar validation and occupational studies have been conducted by other state licensing board's for geology in the United States [and by ASBOG]. The Donnoe and Associates study, mentioned earlier, provided a listing of the knowledge and abilities which must be tested. It also provided a relative weight for each, which translates into the percentage of the total questions on an examination that should be used to test each subject area. "The Donnoe-developed listing, the ASBOG listing, and the listing of knowledge and abilities and weighting used by the Board's Examination Committee prior to the Donnoe study do not show significant differences."
- If ASBOG has performed occupational analysis which reveals the same knowledge, skills and abilities as are tested by the board, and ASBOG administers a test which presumably tests identical skills, abilities and knowledge, then it is questionable why the board can't use the ASBOG examination and eliminate the expensive administration of its own test.

4. For the first 15 years of the board's existence, the vast majority of those licensed were "grandfathered in" and not required to take the examination. Over 28% of current licensees were registered under the grandfathering provisions.

- When the board was created in 1969, Business and Professions code sections 7847.5 and 7847.6 permitted it to waive the examination requirement for geologists and

geophysicists who had 14 years of experience at the time the licensing requirement was enacted. Between 1969-1984 (when the two provisions were finally repealed), almost 5600 individuals were licensed as geologists by the board; however, only 800 of those people ever took and passed the board's licensing exam.

- As indicated, there are currently 3900 registered geologists. Over 28% of current licensees were registered under the grandfathering provision, while "newcomers" -- even those licensed as geologists in 49 or the 50 states -- have been required to take and pass a written examination whose content does not appear specific to California geology or law and whose pass rate is plummeting.

F. Complaint Process

1. There are very few complaints filed against the 4,250 licensed geologists or geophysicists.

For the past four years, there was a total of only 108 complaints filed against geologists or geophysicists. For the past two years, only an

average of 12 complaints per year have been filed. Of these, most were for unlicensed activity, negligence or incompetence. The source of most complaints are split evenly between the public and the industry. In most instances, there is no violation found or there is insufficient evidence.

- The board argues that more complaints could (or should) be filed if the reviewers of geologists work were not constrained by the organization, agency, city or county for which they are working. The board is recommending a BCP to hire an Engineering Geologist, who can visit these offices and agencies to provide information about the board's complaint program and to perform random checks of the public files for potential violations. (This concept is based on the highly effective enforcement program of the Arizona Board of Technical and Professional Registration.)

G. Enforcement Process

Unlicensed Activity

1. The board has taken little, of any, action against unlicensed activity in the past four years.

- The board only recently received approval from OAL of its regulations to implement "cite and fine" authority under sections 145 through 149 of the Business and Professions Code. (The board provides a lengthy overview and history of problems in implementing this "cite and fine" authority.)
- The board sent 10 cease and desist orders and warning letters in 1992-93, 5 in 1993-94, and 2 in 1994-95. All were for either practicing without a license or advertising that they perform geological services without the benefit of a license, including representing themselves as a registered geologist.

2. The practice of the geology and geophysicist profession is not clearly defined so as to determine licensed versus unlicensed activity.

The board states, that presently they do not have a mechanism to efficiently identify unlicensed practice, and that a change in the license renewal process is under consideration which may assist the board to determine unlicensed practice in an efficient manner.

Investigations

1. The board has had few investigations over the past four years.

- Only 9 cases were investigated in 1991-92, 2 cases in 1992-93, 1 case in 1993-94, and no cases in 1994-95. Their board shows more cases completed in 1992 and 1993,

due to a backlog in cases which existed prior to 1992. The board has only one investigation pending at this time.

- The board claims that in most cases investigated, there is all too infrequently insufficient evidence to proceed.

2. The board has not been involved in any inspections or audits of geologic reports.

- The board points out, that other boards used to have their investigators visit the city or county engineers to gain information about violations of the respective board. This was routine until the various boards' investigators were incorporated into the Division of Investigation. Subsequently, all boards had to rely on complaints being filed by the public or contract with DOI to have investigators visit the offices, and the latter action is very expensive.
- The board attempted a similar program by instructing its one licensee staff member (the Executive Officer) to visit the building departments in the cities and counties which had codes requiring geologic reports. Due to the increased workload in the licensing department, the visits were temporarily stopped.
- The board also submitted a BCP in 1980-81 to strengthen its enforcement program. The budget change was not approved by the Legislature.
- As indicated earlier, the board, at its August 1995 meeting, instructed the Executive Officer to prepare a BCP for a licensed staff to perform inspections/audits at various agencies statewide on a random selection of reports and to investigate reports for major geologic failures.

3. There have been substantial delays in completing investigations.

- Most investigations over the past four years have taken more than one year, and in some instances as long as three years. The board claims that a high turnover in personnel contributed to delays in closing some enforcement cases.

Disciplinary Action

1. Cite and Fine regulations under Section 125.9 of the Business and Professions Code were written concurrently with those for Sections 145 through 149, and were only recently adopted by OAL.

- The board has had citation and fine authority as to licensees since 1986 (under Section 125.9 of the B&P Code), but never attempted to adopt citation and fine regulations until mid-1993 when it became evident that the board would be reviewed by the Senate Business and Professions Subcommittee on the Effectiveness and Efficiency of Boards and Commissions. The board only recently received approval of its regulations pertaining to the authority to cite and fine both licensees and nonlicensees.

2. The board has taken little, if any, action against licensees over the past four years for incompetence or other violations of the licensing act.

- A total of 4 accusations have been filed over the past four years. Of those, a stipulated judgment was reached for one, a license surrendered for another, and three are pending with the Attorney General's Office. Only one statement of issue has been filed where the license was denied due to lack of experience.

Disciplinary Case Aging Data

1. There have been delays in completing enforcement cases.

- During 1992 and 1993, a backlog of enforcement cases was cleared by hiring a licensed professional to investigate the cases. This was accomplished using a contract arrangement. Three of the accusations filed took three years or more for completion, and one case was closed within two years.

Enforcement Costs

1. Costs of investigation and prosecution are a small part of the overall budget of the board.

- Costs for DOI, the Attorney General, for evidence/witness fees, and Office of Administrative Hearings (OAH), were about 7 percent of the total budget of the board. DOI and OAH were generally the lower of the two costs, except for 1991-92 and 1992-93, when DOI costs were higher.
- It is interesting to note, that out of the total \$44,000 spent on enforcement costs in 1994-95, \$27,000 was for expert witnesses.

2. The board has made little use of its cost recovery authority under Section 125.3 of the Business and Professions Code.

- In two recent cases, the board has pled cost recovery in its accusation. There were no prior cases which resulted in cost recovery.

H. Efforts to Improve the Current Regulatory Process

Operational Improvements

1. The board's regulatory mission is somewhat impeded by budgetary, resource and staffing constraints.

- The board claims that its enforcement mission would be enhanced by the addition of a professional licensee on staff whose responsibility would be to visit the offices of city, county, and state agencies where geologic reports are submitted. This staff professional would thus accomplish a proactive enforcement program previously impossible due to staff and budget limitations. The position is also necessary to help implement the policies required for the cite and fine regulations. The board has submitted a BCP for the position.

2. The board's administrative and regulatory changes have not improved its operations or increased its ability to operate more in the public interest.

The board points out the following as examples of administrative and regulatory changes which have improved its operations and increased its ability to operate more in the public interest:

- Adoption of a regulation on Hydrogeology, the "Certified Hydrogeologist Specialty Certification."
- Submission of its cite and fine authority to OAL.
- Achievement of a long-term goal of returning to twice annual examinations.
- Change to laser printed license certificates from the certificates with the hand embossed seal. This resulted in a 3-to-6 month reduction in the time needed for a new licensee to receive their certificate.
- Actively participating in the national Association of State Boards of Geology.

3. The board's proposed administrative and regulatory changes do not address some of the basic problems which are identified in this report.

Some of the proposed administrative and regulatory changes are as follows:

- Planning a workshop on enforcement.

- Use of a criterion passing score, rather than the current fixed 70% exam pass score, and limiting the number of times a candidate can take the licensee examination without further education.
- Review and revise existing policies.
- Evaluate committees' size and composition to bring more flexibility to their procedures.
- Improve public awareness by informing the public and reviewing agencies about the functions and activities of the board by holding public forums in areas where geologic events have caused damage and loss of life.
- Perform investigations after significant failures to determine whether violations of the Act have occurred or whether current standard of practice needs to be improved.

Legislative Efforts

1. Legislative efforts by the board have not substantially improved the current regulatory program.

The board points out the following as examples of legislative efforts made to improve the current regulatory program:

- Support of Senate Concurrent Resolution 45 requiring the State Personnel Board to review the use of the Engineering Geologist job classification because of a problem of the unlicensed practice of geology in some state agencies.
- Addition of the "negligence" standard to the Act, since it was virtually impossible to prove "incompetence" for professional work.

2. The board's proposed statutory changes only minimally address some of the basic problems which are identified in this report.

The board is considering the following statutory changes:

- Clarify the language and structure of the Act with that of a "Model Act."
- Increase uniformity with new acts recently passed in other states in order to improve comity.
- Authorize continuing education and a "code of professional conduct".
- Change the specialty licenses from title to practice acts.
- Clarify that "reviewing agency staff" who exercise geologic judgment must either be licensed or be supervised by a licensed individual.
- Protection from lawsuit for any person or agency submitting complaints.
- Require all public agencies to submit complaints to the board if a substandard report is encountered.
- Clarify that the board has the authority to use documents in public files as a basis for board initiated enforcement actions.
- Require remedial education as part of cite and fine authority.

2.

REVIEW OF NEED FOR STATE LICENSING AND REGULATION OF GEOLOGISTS AND GEOPHYSICISTS

ISSUE: Should the State continue with the licensing and regulation of geologists and physicists and if not, should some other alternative form of regulation be recommended.

RECOMMENDATION:

The State should continue with the licensing and regulation of the practice of geology and geophysics.

FINDINGS:

1. There is some evidence that the unregulated practice of geology and geophysics could endanger the health, safety or welfare of the public and cause significant public harm, but in most instances, only indirectly.

- The board points out that the primary purpose for hiring a professional geologist is to prevent or mitigate potential damage due to geologic hazards, or for the development of a resource such as groundwater, oil and gas, sand and gravel, or other mineral development.
- The board also notes that licensing of geologists and geophysicists protects a variety of consumers, "most of whom are not the immediate client of the geologist or geophysicist." These "indirect consumers" include future owners of the property being investigated, and the present and future neighbors of property. Second, are the agencies (city, county, and state) administering laws written to protect the populace from geologic hazards. Third, are the people who drink groundwater in the general area of a contamination site, and the future users of the particular groundwater basin. Fourth, are the taxpayers who will pay for the reconstruction of roads, utilities, etc. damaged by geologic disasters.
- The type of harm which could occur are those from improperly constructed dams, roads, bridges, construction activities which cause landslides improperly identified earthquake hazards. "They impact the indirect consumer in major ways, by killing them, by injuring them and their families, by disrupting their lives, by destroying their houses, and by eating up their taxpayer dollars."

- Basically, the type of activity or practice of the geologist which could cause the above harm, is that which could result from an inadequate or improperly prepared geologic investigation and report. As stated, "competent geologic investigations and reports provide a reasonable level of protection from these hazards." The board provides an example of damage from landslides which occurred in Los Angeles in 1962. This geologic disaster is what led to California's adoption of professional licensure for geologists in 1968. Some other examples are also provided, but they reflect more of a concern with requiring geologic investigations in the first place, rather than any incompetent practice on the part of geologists.
- Much is said by the board about the harm of earthquakes and investigations concerning faults. It is rather interesting to note, that California is still in the process of discovering faults and mapping areas for potential damage. Geologists assure that no one builds on faults, but those faults which cause earthquakes and severe damage are more difficult to predict, and it is still even more difficult to determine where other potential destructive faults may exist. (The Governor also continues to reduce the amount of money spent on the State's Geologic Hazards Assessment Program, under the Department of Conservation.) How much earthquake damage geologic surveys prevent would seem difficult to quantify at this point in time.
- The board claims that the specialties of Engineering Geology and the related specialty of Hydrogeology have the greatest potential for public harm, and that they require additional testing and experience for these two fields of specialization.
- The board also claims that there is a tremendous potential for public harm from fraudulent geologic investigations and reports. But a review of enforcement activity does not indicate that the board has given this a higher priority.

2. Geologists and geophysicists make judgments which could have potentially major financial, health, safety or other significant consequences for the consumer, but whether harm actually occurs is difficult to determine.

- The board provides some examples of typical professional judgments made by geologists and geophysicists. The first involves earthquakes and judgments made concerning the location, depth, and size (predictability). They give an example of fault identification where a setback zone across property was recommended. However, in that instance, the County Building Department did not enforce the setback zone and the developer built on the fault anyway.
- Another example of where a geologist uses judgment to prevent damage involves the identification of landslides, and what mitigation measures could be used. There was still no evidence given as to how much damage has been mitigated due to identification of landslides by geologists.
- A final example given, involves judgments concerning groundwater investigations, and identification of potential contamination of the groundwater basin. Again, there was no evidence provided where these investigations have prevented contamination from occurring.

3. Judgments made by geologists and geophysicists require a high degree of skill and knowledge.

- Professional geological work is performed at a professional level rather than at a sub-professional or apprentice level, and requires the application of scientific knowledge, principles and methods to geological problems through the exercise of individual initiative and judgment in investigating, measuring, interpreting and reporting on the physical phenomena of the earth. This does not include such routine activities such as drafting, sampling, sample preparation, routine laboratory work, etc., where the elements of initiative, scientific judgment and decision making are lacking, nor does it include activities which do not use scientific methods to process and interpret geologic data.

4. These judgments are, for the most part, independent of oversight or supervision by another person or group.

- Professional geologists, who are licensed, are employed by consulting firms (about 50%) or self-employed (21% to 26%). In these work environments they work independently. The registered geologist or geophysicist is a supervisor and is fully responsible for their judgments and decisions and for those subordinate employees they supervise. The remaining 16 to 17 percent of licensed geologists work for government agencies. Some of those will work in research organizations and the rest will work as regulatory reviewers. In both of those activities they will operate independently.

5. There is a generally accepted core amount of knowledge, skill and ability that a geologist and geophysicist must have to meet minimum competency requirements, but indicators of incompetent practice may be more difficult to measure.

- Documented data on knowledge, abilities, and skill levels was recently compiled (during 1992 and 1993) by the board through a contract with a consulting company, Donnoe & Associates. Under this contract, the consulting company conducted an occupational analysis (Task Analysis) for the registered geologist examination, the certified engineering geologist examination, and the registered geophysicist examination.
- The board indicates that California examinations do test all knowledge, skill, ability and judgment factors developed through the Task Analysis. Testing criteria developed are weighted by a combination of factors to determine "criticality." The "criticality value" is interpreted as the importance of the task within the test specification. In broader terms, the criticality value is the importance of the correct performance of the knowledge, skill or ability (task) in protecting the public. The testing criteria measure the ability of an applicant to meet the definition of "minimum acceptable competency", which for a registered geologist, is as follows:"

"A minimally competent candidate for licensure as a Registered Geologist shall possess the knowledge, skill and ability to accurately recognize, characterize, interpret and assess geologic conditions, resources and hazards as they relate to the health, safety and welfare of the public. This includes independently collecting relevant geologic data; understanding geologic literature, and reports and maps prepared by others; analyzing data to produce an accurate understanding of geologic conditions; and accurately and effectively communicating their results, conclusions and recommendations to peers and the public."

- The board states that geologists have been found incompetent or negligent for not being able to identify landslides or locate faults when other geologists find them easily in the same locations. (Although enforcement activity shows that this has rarely been the case.) Thus, the inability to apply scientific knowledge, principles and methods to geological problems, through the exercise of individual initiative and judgment in investigating, measuring, interpreting and reporting on the physical phenomena of the earth, indicates incompetent practice of geology.
- Indicators of incompetent practice for geophysicists would be the inability to duplicate the measurements, the inability to demonstrate by the known laws of physics how data leads to reported conclusions.
- The board's statement points out the problem with attempting to measure incompetent practice in the field of geology or geophysics. This area of science is not an exact science and difficulties arise in trying to determine when a geologist may have been negligent, or incompetent, in not locating a fault or a potential area for landslide. As noted in one study, "geologists must rely on a lot of residual unknowns and inductive reasoning far more than other design professionals." This may be one of the reasons

for little enforcement action on the part of the board in the areas of negligence and incompetence.

6. There does not appear to be any significant public demand for the regulation and licensing of geologists and geophysicists, and there are those within the profession who have opposed licensure.

- During the 1950s, geologic reports began to be required by cities and counties to protect their citizens from dangerous development practices where geologic conditions were not taken into consideration prior to development and during the grading and construction of a building project. Los Angeles, and some 20 other cities, set up their own qualification boards for engineering geologists. However, some local geologists were barred from working on particular projects because they were not on an appropriate list. This caused both the City of Los Angeles and the professional geologic societies to push for state-wide licensing.
- Not all geologists were in favor of licensing at that time, and there are still some geologists who do not favor licensing. For instance, the American Institute of Professional Geologists adopted a policy of anti-licensure in 1987. Their current policy on professional licensure states that peer certification "is to be preferred as the most effective available means to protect the public health, safety, and welfare."
- There is no evidence that the public has been concerned about the licensing of geologists and geophysicists, since, in most instances, they are not the direct consumers of their services.

7. California is unique in the large number of laws and regulations requiring the investigation of geologic hazards by geologists.

- There are over 71 State Codes and 31 regulations requiring geologic reports. There are approximately 37 counties with ordinances requiring the work of registered geologists, and 109 cities with requirements for registered geologists. There are also federal, state, and local agencies which require registered geologists to perform certain investigations and reports. (The board provided an extensive list of all of these laws, regulations and ordinances.)
- Several federal regulations require geologists to be "qualified persons." The board claims that these federal laws have been the driving force behind the enactment of geological licensing laws in many states during the past four years.

8. Components of the current regulatory program do not appear to provide protections to the consumer and preclude consumer harm.

- The first part to this document provides findings on every aspect of the board's operation and programs. Based on this evaluation, the board's activities do not appear

to provide any real oversight over the work performed by geologists and geophysicists, nor in taking an aggressive stance on improper practices performed by unlicensed or licensed individuals.

- The board points out, that the major impact of their activities has been to develop and maintain a list of those geologists and geophysicists meeting a minimum level of qualification appropriate to the types of investigations needed in California. If this is true, and other activities such as enforcement are secondary, then maybe a simple registration and certification program is all that is necessary.
- The board also points out, that another benefit to licensing is the ability to track geologic work performed, even after a company may have gone bankrupt or out of business. There are instances, however, where tracking geologic work has not really benefited the consumer. In certain areas of southern California there has been a problem of corrosive soils eating away at the foundation of homes. Supposedly geologic surveys were done by the city and developer, but this problem was not brought to the attention of the homeowner. To date, no one has been held responsible for this oversight.
- The board does argue, that once it has in place cite and fine rules, it will be able to more efficiently and promptly react to complaints. It also states that they are proposing legislative and staffing changes to allow a more proactive role in the review of work that has not resulted in complaints from the client consumer, and a more proactive review of significant geologic disasters to determine if there have been violations of the Geologist and Geophysicist Act.

9. There are other ways in which the consumer can control their exposure to the risk of harm which could be caused by poor geologic investigations and reports.

- Insurance against earthquake damage and other types of property damage is available, and is usually the preferred method for protecting property against geologic risks or hazards.
- In all examples given, about the type of damage which occurred due to geologic hazards, there does not appear to be any which are directly related to a poor geologic investigation or report. Most dealt with damage which occurred because a geologic investigation was not requested.

10. Most consumers of geologic services are more sophisticated than the average public about purchasing those services, and therefore can readily evaluate the performance of a geologist or geophysicist.

- Although the board argues to the contrary, it would appear that the ultimate consumer of services provided by geologists is generally more sophisticated than most in choosing a qualified geologist. This is certainly true of an "agency reviewing

geologist", who is from a building department, health department, or Water Quality Control Board, and is a repeat customer of the registered geologist performing work in their area of jurisdiction. Other consumers can include land developers, oil and mining companies, and on occasion, a person building a home on a hillside lot. (However, a person building such a home would still have to seek building and grading permits before construction.)

- Geologists who work for oil companies and mining companies are not required to be licensed by the board. This is considered as "in-house" work for those companies, and as such, it would not impact the public health, safety, and welfare of the public. However if the company is selling the oil or mineral prospect on the open market, or submitting reports to regulatory agencies, the geologist must be licensed by the board. This may tend to cause some confusion among companies as to when their employee geologists must be registered.
- As indicated by the board, most geological consulting firms rely heavily on referrals and repeat business, so there is some motivation to provide for qualified and competent geologists and geophysicists. Therefore, competitive market forces could be relied upon to drive the incompetent geologist or geophysicist out of business.

11. There are other public agencies, both state and local, which provide some oversight of the services provided by geologists and geophysicists, but there are few geologists and geophysicists who are currently licensed or regulated by another board.

The Department of Conservation's Division of Mines and Geology and its State Mining and Geology Board provide for programs which seek to prevent or minimize injury, death, and property damage resulting from geologic hazards. The Department is the State's resource center for scientific information and data concerning California's geologic, seismologic, volcanologic, earthquake engineering, and mineral resources. This information is used by government agencies, industry, and the public for land-use decisions and the safety of persons and property from geologic hazards. The Seismic Safety Commission mission is to improve the wellbeing of the people of California through cost-effective measures that lower earthquake risk to life and property. They primarily gather and disseminate information that guide and stimulate earthquake risk reduction and management. Local agencies have, as indicated earlier, their own "in-house" geologists to review and approve reports submitted by registered geologists.

- There is a very small number of registered geologists who have university degrees in both geology and civil engineering. It is estimated that less than one-half of one percent of registered geologists are dual licensed as civil engineers or geotechnical engineers. There are some states, however, which have combined the licensing of geologists with the engineers.

12. There are 26 states which regulate geologists. No other states regulate geophysicists. No other states have deregulated the profession of geology once a license act has been enacted. For those states which do not regulate geologists and geophysicists, there is no indication that consumer harm has resulted.

- Twenty-six (26) states now regulate geologists, an increase of 9 in the last four years. An additional 4 states have a regulatory definition governing the practice of geology. Additionally, Iowa, New Jersey, Nevada, and Texas have specific requirements in different agencies governing the practice of geology. No other states regulate geophysicists or hydrogeologists. Georgia and Oregon also regulate engineering geology, and the licensure acts for Arkansas and Minnesota authorize the licensing of engineering geologists but have not implemented the power.
- Of the 26 states which regulate geology by law, 18 have practice protection laws similar to the one in California, 5 have title protection only, and 4 have the statutory definition of the practice.
- Only 20 states have independent regulatory boards. The other states have a department or division which regulates the practice.

- From a comparison of the other 24 states, there is no indication that consumer harm has resulted, or that the consumer has been affected in any significant way, from the unregulated occupation of geology and geophysics.

13. There does not appear to be any substantial savings to the consumer (agencies or businesses) which would result if the licensing of geologists and geophysicists was eliminated.

- Although the board did not have overall data on the amount of money spent annually in California for geological services, it would seem that direct and indirect consumers would still pay geological consulting firms the same price for services, even if some other regulatory option such as certification was chosen.
- The current licensing program may restrict the supply of geologists and geophysicists available in California, but the current directory of licensed geologists list 1,050, and current unemployment figures pertaining to geologists, indicate that there is more than enough geologists available for maintaining a competitive marketplace.

14. There are some occupations similar to geologic and geophysical practices which are not regulated.

- Some geologic practice is not regulated at all. These geologists do similar things as registered geologists, and have similar training and experience. The primary difference is that they are not defined as performing work for the public. The exploration for oil or extractable minerals is solely in-house work for those corporations. As long as they are not selling the oil or mineral prospect on the open market, or submitting reports to regulatory agencies, they do not need to be licensed.
- On the same basis, mining and petroleum geophysicists do not need to be registered, while geophysicists working on groundwater contamination or locating buried drums of hazardous waste do need to be licensed.
- Soil Science is an unregulated profession that has expressed concern that their normal practice should not be considered geology. Generally, soil scientists are concerned with agricultural factors such as what crops will grow on a particular soil, or how well water will infiltrate the soil to water the crops, etc. A very small number of soil scientists cooperate with geologists, usually on fault investigations where it is sometimes difficult to differentiate between soil-forming processes and features caused by faults.

15. Geologists and geophysicists do, however, work with many other professions, some of which are licensed.

- Geologists and geophysicists work with registered civil engineers and geotechnical engineers on construction and environmental projects. Geologists are trained to consider the entire physical environment, the materials that compose it, and the dynamic processes that drive it. Engineers are more concerned with facility design including material and structural properties, construction considerations, and safety factors. Geologists and engineers generally work together making sure that all natural and manmade influences are considered in a project.

16. There may be other alternatives to the current regulatory program which would not require the licensing of geologists and geophysicists.

- **Total Deregulation.** The board argues that in California, a state where every possible geologic phenomenon can occur; earthquakes, tsunamis, subsidence, landslides, avalanches, floods, liquefaction, collapsing soils, even volcanic eruptions, it is critical to the welfare of the people of the state than an appropriate mechanism exist to determine the qualifications of those practicing geology for the public.
- **Public or Private Certification and/or Registration.** The board argues against this alternative primarily for two reasons: (1) Board enforcement offers quicker resolution of problems, covers a wider range of matter than do overcrowded court calendars, and sends the practice standards message out to the profession more effectively than do court cases. (2) The recent court case of *Abramson vs. Gonzalez* makes title acts inadvisable. [A review of this case shows no apparent reason to dismiss the use of title acts versus practice acts in regulating an occupation.]

However, based on a review of these findings, this could be considered as a viable option for deregulating this profession. In cases where consumers cannot easily protect themselves from incompetence, certification and/or registration is generally regarded as a low cost means of protection that permits a high level of flexibility. The board even admits that one of its primary functions is to keep an ongoing "registration" of geologists.

The Department of Consumer Affairs needs to investigate further whether statewide licensure of geologists should continue. It should also determine whether a geology bureau, or a merged geologist/engineer bureau, would suffice; or whether the licensure, certification and/or registration could be performed by the State Mining and Geology Board, the Seismic Safety Commission, or some other agency where it can be combined with a related program to achieve economies of scale and efficiencies.